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separate groups, and are not so imposing in appearance as Kani-goorum. Iron-ore is found in the surrounding hills, and yields a metal which is highly prized by the natives, and is exported in considerable quantities into British territories. Every village and hamlet has its smelting-furnace, constructed with a conical roof of long poles planted nearly vertically in the ground. The ore is poor and scanty, and the iron extracted from it is said to owe its value chiefly to being smelted with charcoal.

Perhaps the most remarkable feature of the whole district is the Ruzmuk plain before alluded to, which lies right across the watershed of the range connecting the Shah Hyder and Gubbur mountains, and is 7 miles long by 2 on an average broad, with a mean elevation of 6,800 feet above the sea. It has a very gentle slope southwards, and its waters drain into the Tâk-ke-zâm. On the north it terminates abruptly in a perpendicular scarp of about 400 feet over the valley of Khissara. Here the road descends down a spur, and is narrow and difficult, but a few hours' labour rendered it practicable for our 9-pounder guns to descend, dragged by horses. If ever our relations with the Mahsood Wazeeris are sufficiently friendly, we may find the open and elevated plain of Ruzmuk admirably adapted for cantoning European soldiers. The soil is sandy, and vegetation is not too luxuriant to be unwholesome. Within 5 miles there are mountains 11,000 feet high, on which sanitarium might be established. Judging by the inhabitants, the climate must be peculiarly healthy; for they are handsome, well made, and vigorous beyond the average even of Affghan mountaineers.

*Office of Trigonometrical Survey of India, Calcutta,*  
*March 30th, 1862.*

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XXII.—*Notes on the Flora of the Country passed through by the Expeditionary Force under Brigadier-General Chamberlain, against the Mahsood Wuzeeris; April 17th to May 19th, 1860.*

By JOHN LINDSAY STEWART, Esq., M.D., Assistant-Surgeon.

PREVIOUS to the end of 1859 the tract of country which includes our trans-Indus territories and the mountains to the westward, *i. e.*, from Peshawur to Mittunkote, and from the Indus to Ghuzni, was a *terra incognita* to botanists. On all sides of this space circumstances had enabled more or less to be done to elucidate the flora, but the district I allude to would, in a botanical chart, have been a perfect blank. In these circumstances, and especially in these days, when access to an unexplored district—acmé of delight for the pursuer of any branch of natural history!—is so rare, I

might well be gratified at having it in my power, through the kindness of General Chamberlain, to accompany the first and second Wuzeeree expeditions, and thus to do what in me lay, and circumstances permitted, to fill in some few of the details in a part of this blank.

I may preface my remarks on the flora of Wuzeeristān by the statement that, botanically speaking, the exploration of any part of this tract must be interesting from the circumstance of its tending to show the relative distribution of members of the Persian and Indian floras which lie on either side of it; and this even although, as in the present case, the country be arid and stony, the climate dry, and therefore the flora numerically a poor one.

The first expedition against the Wuzerees was necessarily undertaken in the "dead of winter," and without the important supplement of the second its botanical results would have been of comparatively trifling value, as of course many of the specimens collected during the former consisted only of a scrap or a few leaves. In this sketch, therefore, I shall chiefly confine myself to the vegetation of the country of the Buttunnies and of the Mahsood and Momeetzāi Wuzeeris, which the second expeditionary force passed through in its progress from Tāk, the place of rendezvous, up the ravine of the Zām stream, to Kanigoorum, and thence down the Khyssore to Kurano, where it broke up; and I shall adopt a modified "diary" form as perhaps the best suited to my purpose.

In connection with the native names of plants, Pū. will represent Pushtū (the language of the Affghans), Pī. for Punjābī, and Hī. for Hindustānī.

The city of Tāk, near which the force assembled, is situated in an oasis of date-trees and cultivation (at that season—April—chiefly of barley and beardless wheat), which looked very refreshing after the excessively dry and dusty country on either side of the southern fork of the trans-Indus Salt Range, through which our road had lain. Irrigation is accomplished by a cut from—I believe—the Zām of Tāk, a stream which issues from the Buttunic Hills a few miles to the west of the city.

Almost the only trees besides the date-palm were fine *Dalbergia sissoo* (*shūsham* Pī., *shewa* Pū.), along the watercourses; *Tamarix dioica* (*furās* Hī., *furwā* Pī., *khwa* Pū., and *ghuz* Persian), common as jungle; mulberries, and the large variety of *Zizyphus jujuba* (*ber* Hī., *berra* Pū.)

*Capparis aphylla* (*karīl* Hī., *kīrrā* Pū.), covered with its showy flowers, was abundant, and the other ordinary shrubs were as follows: the small variety of *Zizyphus jujuba* (*jharberī* Hī., *karkan* Pū.); *Prosopis stephaniana*, generally a small shrub, and just coming into flower; *Acacia farnesiana*; and *Salvadora*. The

last (*pīlū* Hī., *plewan* Pū.) is common at many places along the frontier, and its fruit is held by the inhabitants to be a great provocative of sexual crimes, but the chances are that its supposed effects arise less from any aphrodisiac qualities than from the opportunities afforded when parties of both sexes go out from the villages to gather the ripe fruit.

Of smaller plants the most common and notable were the following, almost all of which are highly characteristic of this region : *Alhagi maurorum*, the (*Shutur khār*, Persian) camel-thorn (a name often erroneously applied to the *Zizyphus*); *Crotalaria burhia*, a plant with a remarkably tough fibrous bark, which might possibly be of use as a textile material; *Æruea javanica*; *Solanum nigrum*; *Convolvulus pluricaulis*; *Microhynchus nudicaulis*; *Carthamus oxyacantha* (nearly related to the Safflower, and itself, as I was told, cultivated for a dye to the south of this); *Rumex acutus* and *Polygonum aviculare*; with abundance of five or six species of *Salsolaceæ*. The last (with the *Tamarix*) here as elsewhere affect a saline soil, and from them, under the name of *lānā*, an impure alkali (*sajjī mattī*) is prepared in immense quantities in various parts of the Punjāb. Of this family I have in all got twelve species on this frontier, but Griffith collected more than double this number in Affghanistān, and they appear to culminate in number and variety in Southern Siberia and on the Kirghiz Steppes.

The commonest grasses were *Cynodon dactylon*, *Eleusine flagellifera*, *Andropogon Bladhii*, and a *Cenchrus*.

These, the ordinary plants about Tāk, do not differ from those we had had most of the way from Peshawur. Most of them are common at the latter places, and except *Crotalaria burhia* there is not one I have not got within 20 miles of it.

The only novelties I got here were two *Asclepiads*, neither of them in flower, but probably a *Pentatropis* and a *Cynanchum*.

The country round Tāk is a nearly level plain, and the soil mostly of clay, in horizontal strata, but slightly cut up by ravines, and on the sides of these sand and gravel occasionally appear. The only large ravine is one which runs along to the south side of the city. It is very marshy, and has (with other marsh-plants) an abundance of *Typha angustifolia* (*gond* Hī., *dīb* Pī., *rūkh* Pū.), the leaves of which I noticed to be used as thatch in the city, as they are in many other localities.

Not far from Tāk I had got two novelties, connecting the vegetation of two very different regions, viz., *Neurada procumbens*, a member of the flora of Arabia and Sinde, and a *Calligonum* (probably undescribed), which genus is common in Mongolia. Both of these were abundant within a space of a few miles, but I found neither of them elsewhere.

In the city itself, besides the ordinary mulberry-trees, &c., I observed a few trees of *pīpal* (*Ficus religiosa*), and *Acacia arabica* was abundant, although not seen to the north of this. *Cannabis sativa* is a common weed in the extensive gardens to the north of the city, and I saw one patch of the pilose variety of *Cichorium intybus* (*kāsni* Hī.) cultivated for the *pansāris* (drug-vendors), who sell the seeds of it as a "warm" medicine.

On April 17th we marched from Tāk, and after a gentle rise of some miles entered the eastern edge of the hill-country by the channel of the Zām (probably a generic term for a small river, as there is at least one other Zām, a few miles to the south), up which lies the main road to Kānigoorum, the central city of the Mah-sood country.

This ravine is at first in most places a wide and easy one, with occasional masses of *Tamarix*, *Typha*, *Equisetum debile*, &c. It has been formed by the stream in the course of ages cutting through the alternating beds of sandstone and conglomerate which constitute the whole rock here, and which generally dip towards the south-east at varying angles. These rocks, as Professor Oldham informs me, probably belong to the same section of the Tertiaries as the Siwālik or Sub-Himalayan series and parts of the Salt Range.

Here the *Acacia modesta* (*phulālī* Pī., *pulosa* Pū.) was in full flower and perfume, with *Capparis aphylla* and *Salvadora* not uncommon; also *Grewia betulæfolia*, which is called by the Kohātis *Shikhārī mewa*—it is difficult to see why, as he would be a hungry hunter indeed who would be tempted by its miserable little fruit.

A tall *Aristida* was abundant in the bed of the stream, and a small *Andropogon* I had not previously got.

We encamped at Khāgī Zīārūt on a lofty plateau of horizontal beds of shingle, which here bordered the Zām ravine. Most of the rock in the neighbourhood was conglomerate, generally in horizontal strata, but occasionally bent in a remarkable way, especially to the south-east of camp, at a narrow gorge through which the stream passed.

Our march of April 18th carried us 10 miles farther up the Zām. Above Khīrgī groves of *Vitex negundo* (*shamālū* Hī., *marivande* Pū.) were frequent along the edges of the ravine; and *Cocculus Leæba*, a common Punjāb plant, hung abundantly from the cliffs on either side; while *Dalbergia sissoo* got more common, one or two date-palms were occasionally seen, and *Calotropis procera* (*spulmei* Pū.) became frequent in the shingly bed of the ravine. *Acacia modesta*, *Capparis aphylla*, and *Salvadora* continued. *Peganum harmala* (*spelane* Pū.), a plant common from Delhi to Peshawur, and into Affghanistān, was frequent, with

*Centaurea calcitrapa*, *Cousinia calcitrapæformis*, and *Carthamus oxyacantha*. *Malcolmia africana* and a *Plantago* with broad sericeous leaves (*P. eriantha*?) were also common.

Three tall grasses were abundant—an *Arundo*, a *Saccharum*, and the *Aristida*—as well as *Alopecurus pratensis*, *Polypogon monspeliensis*, and *Cymbopogon iwarancusa*; the last, however, here almost destitute of the peculiar turpentine odour, whence it derives its name of “lemon-grass.”

The geology of the day's march was similar to that of the 17th; the generally wide shingly bed of the stream being flanked by low hills, composed of conglomerate and soft sandstone, in alternating beds, dipping mostly towards the north-west, at varying and generally low angles. Here also, as on the previous day, part of the river-valley (if so it may be called) was often filled up by horizontal beds of shingle—generally to the height of 50 or 60 feet—which formed plateaux from a few yards to many acres in extent; these are called *ragzhas* by the natives.

At the place of our new camp, *Palosīn* (probably derived from *palosa*, the Pushtū name for the *Acacia modesta*, according to a practice common with Affghāns, as among other nations), the country opened out considerably; *i.e.*, the higher hills retired to some distance from the stream, the plateaux on either side were of greater extent than usual, and close to the bed of the *Zām* was a low flat of alluvial deposit, under cultivation, and sufficiently large for the force to encamp on.

On the west side of the stream (here running in a southerly direction) there was one place well supplied with moisture from canals, with a grove of *Dalbergiæ* and *Morus*; and under the trees a number of the smaller spring-plants were still preserved from desiccation by the shade and damp. Of these *Trigonella incisa* was profuse, and there were still a few tufts of *Arnebia echioides*. One of those plants is interesting, from just extending from the “Oriental” district into our Indian possessions; it is common trans-Indus, and I have found it as far east as the *Hurroo*, near *Hussan Abdāl*. It has a very agreeable odour and a pretty yellow corolla, with five dark purple spots on it, which pious Mussulmāns assert to be the marks of Mahomed's fingers. Hence they call it *Paighambari-phūl* (Prophet's flower), and hold it in high favour.

Another interesting plant common here was the *Withania coagulans* of Affghanistān and *Sinde*, which extends at least as far east as *Jhelum*, and is abundant in our trans-Indus territory. It is the *punīrī* or *punīr-bād* (cheese-herb) of Affghāns, so called from being used in some places (*e.g.* at *Candahār*, as Dr. Bellew informs me) as rennet. It is not, however, applied to this purpose about *Peshawur*, but is there used as a stomachic. It is curious that Dr.

Livingstone alludes to a plant of the same family (Solanaceæ), which in some parts of Central Africa is used for a like purpose (coagulating milk), and has a name of similar signification.

Forskählia tenacissima, another Western plant extending a short way into India, was pretty common on cliffs; while Salsolaceous plants were much more rare than in the saline Tāk plain.

As about this time a transition occurs in the geological formation of the district, and the flora also soon after this become different, it was fortunate for my purpose that the part of the force to which I was attached remained encamped, near Palosin, for twelve days, so that I had full time to botanise, &c., in the neighbourhood.

Although the hills around were almost as bare of soil as those we had passed, yet there was more verdure on the former, as well as near the banks of the stream and the numerous irrigation-canals. Some of the latter were works of great labour, one I remarked being carried for at least 2 miles along the side of a hill; but as the surface was of loose shaly limestone, and the plateaux to which the canal went was quite barren, I presume that, after their Sisyphean labour, the Wuzerees had found that all the water disappeared long ere it reached its destination.

The ordinary shrubs were *Acacia modesta*, *Zizyphus jujuba*, *Capparis aphylla*, *C. spinosa*, *Abutilon indicum*, and a small *Taverniera*, with pretty pink flowers. One or two climbing *Asclepiads* occurred; and *Periploca aphylla* (*barrarra* Pū.), an almost leafless erect one, was common, as in many places along the frontier.

Of smaller plants there were the following (besides many previously got):—a pilose *Erodium*, a *Polygala*, *Convolvulus pluricaulis* (which is esteemed by the Punjābis as a “cooling” vegetable), a large odorous *Salvia*, *Boerhaavia procumbens*, and another *B.*, *Allium leptophyllum*, *Rumex vesicaria*, and *Portulaca quadrifida* (also held to be medicinal by the Punjābis).

The common grasses were, *Andropogon Gryllus*, *Cymbopogon iwarancusa*, *Eragrostis cynosuroides*, *Eleusine flagellifera*, a *Chloris* (*C. villosa*?), *Heteropogon contortus*, *Aristida setacea*, a species of *Melica*, *Pennisetum cenchroides*, *Imperata Kœnigii*, and *Cynodon dactylon*. The two last grow only when the ground is at least periodically moistened; while all the others flourish where there is no moisture and but little soil.\*

Among the more notable plants were a species of *Cometes*; a shrubby spinous *Astragalus*, with yellow flowers (hence called *zare*, golden, in Pushtū); a *Rubiaceous* plant, with a scarious perianth,

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\* *Cynodon* and various species of *Pennisetum* are, in the Punjāb, reckoned good for milk as pasture.

and, when bruised, a most vile odour; a small half-shrubby spinescent *Convolvulus*, and two shrubby *Rhamni*.

*Tecoma undulata* (*whirā* Hī., *regdāwan* Pū.), with its splendid orange flowers, was common; as was a species of *Caralluma* or *Boucerosia*, which affects dry rocky places along the frontier, and as far east in the Himalaya as Rajaorī. Its tetragonal leafless stems are intensely bitter, and are regarded as stomachic by both Pathāns and Punjābis. Its Persian name, *Panj-angusht* (five fingers), is descriptive of its appearance.

On April 26th, we moved camp fully a mile farther up the stream.

The change in the geology, to which I have alluded, was of this nature. Below Palosin, the whole of the rocks seen *in situ* had been conglomerate or soft sandstone, probably contemporaneous with the strata of the outer Siwāliks; but immediately above our first camp at Palosin, limestone began to appear, frequently in the form of isolated knife-like ridges of 60 or 70 feet high, the jagged edges of the nearly vertical strata rising high in the air, and presenting a curious appearance. The most conspicuous of these sub-erect ridges were of a cherty, whitish, non-fossiliferous limestone. Besides this there were a greyish hard limestone, a soft, white, chalky limestone, both without fossils; and in some places nummulitic beds, almost wholly composed of shells, mostly small, and apparently of only two or three different species. This last rock was best seen in a ridge between our first and second camps; and on the upper (western) slope of the strata was a deposit of tons of the nummulites, caused by the disintegration of the binding portion of the rock, and called *paisa*, i.e., coins, by the natives of districts where they occur. Along with these were strata of earthy shaly limestone, and there were numerous beds of decomposing parti-coloured marls, containing a good deal of salt (as evidenced by the efflorescence on their surface). These, by exposure to the air, were reduced to mounds of dark-coloured dirt, simulating the ash-heaps of some Cyclopean smithy.

Another noticeable feature here was the occurrence of numerous masses of limestone, from an inch to a foot or two in diameter, apparently entirely composed of corallines and allied forms. These were nowhere found *in situ*, but lying detached among and upon mounds of *débris* of various rocks, and scattered over the valleys between the limestone ridges. In some cases I found the impressions of similar corallines on the surface of the more vitrified non-fossiliferous limestone.

About half-a-mile above our new camp there was a small grove of *Populus euphratica*, with its curiously diverse-shaped leaves. Here it was rather stunted, but on the first Expedition we had met with some fine trees.



On May 1st I was enabled to make a short excursion of 3 or 4 miles among the hills to the northward with the survey party, and found one or two novelties, such as an *Edwardsia*, with fine yellow flowers, and a few shrubs of *Boswellia* (?). Here also, in addition to the shrubs I have formerly noted, *Reptonia buxifolia* (*goorgoorā* Pū.) was common, as in many places along the frontier.

On May 2nd we made a short march of 4 miles up the Zām, passing through a continuation of strata similar to those at Palosīn.

Here were a few plants of *Eremostachys laciniata*, which is occasionally trans-Indus, and *Acacia jacquemonti* became more common than it had previously been.

On May 3rd, towards the end of our march of  $4\frac{1}{2}$  miles, the hills began to be better covered with the usual shrubs, and there were along the banks of the stream numerous fine trees of *Morus*, *Populus alba*, and *Salix babylonica*.

The rocks were similar to those of the preceding day, various limestones, with occasional beds of the disintegrating, parti-coloured, marly shells; and just above camp the ravine was narrowed into a gorge (the *Tungāi*, or Pass of Anāi) by a ridge of limestone, hard, grey, and non-fossiliferous, rising to 150 or 200 feet above the stream, the strike of the strata being S.W. and N.E., with a moderate dip to the N.W.

By our camp were some finer olive-trees (*Olea europea*, *kāu* Pī., *khwan* Pū.) than we had before met with. This is one of the common trees on all the lower hills I have visited on this frontier, and its well-known hard wood is useful for many purposes.

In the ravines of a hill close by Anāi, I found abundance of a species of *Sageretia* (undescribed?), the fruit of which is very pleasant; and, with that of some other species of the same genus, is called *Mūmānī* by the Affghāns.

*Dodonæa Burmanniana*, and a spinous *Celastrus* (both common along the frontier), with the *Olea* and *Reptonia*, constituted most of the shrubby vegetation of the hills here.

It is curious enough that up to near this point the five plants last mentioned had not been seen; and I remarked a similar infrequency of all of them in the Bahadurkheyl branch of the trans-Indus Salt Range. Their absence can hardly be accounted for by aridity, as I have found all in situations quite as dry as either of these; but it may depend either on the saline constituents of the soil in both these situations, or on the nature of the rock, which, where these shrubs are common, is limestone or slate; while where I have remarked their absence, it has been sandstone and conglomerate.

On May 4th we moved 8 miles up the Zām; but as the fight at the *Barrarra* Pass occurred in the course of this march, I was

hardly able to devote the same attention to plants as would have been given to them had our progress been unopposed.

Just after passing through the Anāi Gorge, the ravine of the Zām became considerably narrower than it had previously been, being enclosed by high cliffs of greyish limestone, overlying, unconformably, strata of the parti-coloured shales. The plateaux of horizontally deposited shingle, frequently skirting the stream, also became much higher, being sometimes as much as 150 feet above its bed.

The flora now began to change somewhat. One or two peach-trees occasionally occurred, and a second fern (*Pteris longifolia*) made its appearance; the only fern hitherto seen having been *Adiantum capillus veneris*, which is common at damp shady places all along the frontier. I also saw in the bed of the stream one or two cones of *Pinus longifolia*.

On the hills, *Chamærops Ritchiana* (*mazare* Pū.) was now abundant. It is possibly identical with *C. humilis*, the only European palm, and is common on the lower hills of Affghanistān and this frontier, above 1500 feet. The farthest east that I know of its being found is Sarkesar, one of the higher and central hills of the cis-Indus Salt Range. Its leaves are used for making ropes, mats, sandals, &c.; and the reddish mossy-looking hair found in the axils of the petioles is used by the Pathāns for touch-paper.

At the Pass where the enemy "stood," the Zām had cut its way through a ridge of the grey, non-fossiliferous limestone; and beyond this point the ravine, in which our road lay, was much more confined than hitherto by the rugged heights to the right and left. The character of the vegetation also became still more altered, as we had now reached a height of nearly 4000 feet above the sea.

*Daphne oleoides* and *Buxus sempervivens* were common, as well as *Sageretia* and *Olea*; while a bramble (*Rubus fruticosus*), not uncommon on the frontier, hung in masses from the cliffs. An oak also (probably *Quercus ilex*) was met with on the heights, while just at the Barrarra Pass a few wild trees of *Punica granatum* were in flower. An unflowered *Mentha* (probably *M. incana*) was abundant at wet places, as well as *Ranunculus laetis*; *Fragaria indicu* occurred, and *Gardenia tetrasperma* was not uncommon.

Close by our new camp at Bungi Wāla (probably nearly 4500 feet above the sea) was a fine jungle of *Vitex*, *Celtis nepalensis* (?), &c., with abundance of *Eremostachys*, and a number of the small vernal *Cruciferae*, *Caryophyllaceae*, &c.

On May 5th we marched 15 miles to reach Kanigoorum, the penetrale of the Wuzere country, and encamped at 6500 feet above the sea.

During this march the hills were mostly composed of thin-bedded calcareous shales, in one part especially covered with obscure impressions of *Algæ* (?), and often alternating with quartzite in thick beds, which were frequently much contorted. The dip was generally towards the north-west, at about an angle of  $45^{\circ}$ . The high masses of shingle were still common along the skirts of the ravine of the stream, but their composition had changed greatly since Palosīn. Here the pebbles were mostly of schistose limestone and granite-rock, both of which, especially the latter, had been infrequent below and to some distance above that place.

During the latter part of the march, almost all of the semi-arboreous vegetation of the rounded hills above which we were gradually rising consisted of two oaks, *Quercus ilex* and *Quercus laxiflora* (?), the former being much the more common.

*Morus*, *Populus*, and *Salix* continued near the bed of the stream, but *Dalbergia* ceased below this.

The more noteworthy plants, of about forty species, which I had not previously got on this trip, were the following : Apricot, occasional ; Peach, at one or two places ; *Cotoneaster rotundifolia*, common ; a shrubby *Cratægus* (?), forming a striking object with its masses of white blossoms ; *Spiræa Lindleyana*, abundant ; *Buddlæa crispa*, frequent ; *Jasminum revolutum*, occasional ; *Abelia triflora*, with pretty pink blossoms and a delicious perfume, common ; *Berberis lycium* and *Clematis grata*. Two spinous *Astragali* were abundant latterly, both new to me, and probably Afghan forms ; *Scutellaria linearis*, *Ajuga parviflora*, *Phagnalon denticulatum*, a second species of *Cousinia*, a small *Valerianella*, a *Valeriana*, and *Saxifraga ligulata* occurred. *Centaurea calcitrapa* accompanied us all the way, as well as the tall *Aristida* ; and *Chloris*, a form of *Polygonum aviculare*, was profuse at our camp ; and a species of *Thymus* quite carpeted the ground and perfumed the air in some places.

On May 7th I accompanied the survey party to the top of a hill called Bar Pit, about 6 miles to the s.s.w. of our camp ; and, as it was 1700 feet higher than the latter (indeed, the greatest elevation we reached during the expedition), I got a number of plants that I had not previously met with.

During part of the ascent *Berberis* was common and the *Buddlæa* abundant ; with a second species of *Celtis* (*C. caucasica*), *Edwardsia*, *Spiræa Lindleyana*, *Rubus*, and Apricot. These, however, we left behind with the brook up the bed of which our road lay for a short way.

Higher up, the two oaks constituted the mass of the wood to the top of the hill, and the following were more or less common. A second *Clematis*, *Jasminum officinale*, *Lonicera quinquelocularis*,

*Abelia*, *Viburnum cotinifolium*, *Cotoneaster vulgaris* (?), *Cratægus*, and *Indigofera*, and one or two plants of a *Syringa* were met with.

Near the Kanigoorum brook, *Plantago major* was common, as well as *Oxalis corniculata*, *Trifolium repens*, *Malva parviflora*, *Mentha incana*, *Adiantum capillus veneris*, and *Barbaræa vulgaris*; all, except the last, not uncommon on the plains along the frontier.

Higher up on the hill were found *Taraxacum officinale*, *Thymus*, *Scutellaria*, *Morina Wallichiana*, *Scabiosa succisa*, *Serratula pallida*, one or two spinescent *Astragali*, several *Labiata*æ, *Androsace incisa*, *Valeriana*, *Fragaria vesca*, a *Viola*, *Trigonella Emodi*, and *Polygala elegans*.

The only parasitic plant was *Viscum album*, which was abundant on oaks near Kanigoorum village; and the only orchid was *Cephalanthera ensifolia*, which was common half-way up the hill, and has now been found in many places from the farthest east to the extreme west of British India.

It was rather a disappointment to me to find that on this hill there were no pines, although they were plainly visible at a height somewhat above this some few miles off on the magnificent Peer Ghul, which here represents the centre of the Suleiman Range.

Most of the strata of Bar Pit appeared to be of calcareous schists and quartzite, generally dipping towards the north-west at a high angle. This hill, being higher than most of the others near it (except the Peer Ghul and its congeners, which towered some 3000 feet above us), commanded an extensive view: and it could be seen that although the various ridges of the hill-mass through which we had come, and which lay stretched below us to the eastward, were disposed rather irregularly, yet there was a general tendency to a north and south direction; and the usual strike of the strata, as observed on the way to and from Kanigoorum from below, corresponded with this.

On May 9th we marched 8 miles down the stream by the same route as we had gone up, so that there was but little novelty for me. About half-way, however, I found *Rubia cordifolia* pretty common,—the only time I have ever got it trans-Indus. There were also at one place in the bed of the stream a few plants of a *Poterium*. I also found several bushes of a white-flowered *Rosa*, and *Veronica biloba* were abundant in some fields.

On May 10th we marched from Dobōi, at about 5000 feet above the sea, and leaving our upward road moved to the northward up a feeder of the Zām.

*Olea* and *Quercus* were both very common, with *Viscum* frequent on the former; *Vitex* occurred in damp places; the *Rosa*

of the 9th was occasional, and *Erodium cicutarium* and *Chenopodium botrys* (both common plants of the plains on the frontier) were abundant.

The rocks were mostly similar to those passed through on the 9th; and in some places irrigation canals had been, with immense labour, tunnelled through the schistose ridges.

Our new camp of Tandachina was on a wide shingle plateau, where a pink-flowered spinous *Astragalus* and the *Kāneegoorum Cousinia* were abundant. Shrubs were few and small, and consisted of *Cotoneaster rotundifolia*, *Olea*, *Berberis*, *Edwardsia*, and *Daphne oleoides*. The commonest grass was the *Chloris*, which appears to delight in the most arid situations.

Here a puzzling root was brought to me by an Afreedee sepooy. It is called in Pushtū *kweri*, and the specimen I got was of a yellow colour, hard and woody, about an inch in diameter, with a strong but not disagreeable bitter taste. It is said to be abundant in Teerah (a district in the hills south-west of Peshawur), where it is much valued as a stomachic. As I did not find the *plant*, I presume it had not then sprung up, but, from the description, it is probably a thorny *Smilax*.

On May 11th I had an opportunity of accompanying up one of the spurs of Peer Ghul a regiment which was to aid in covering the operation of destroying the collection of villages known by the name of Makeen, which lay around a small fertile basin watered by a brook, and enclosed by that and another spur.

The ridge we ascended was several hundred feet higher than the camp-plateau, and had a scanty shrubby vegetation of *Quercus*, *Berberis*, *Edwardsia*, &c. There were two or three trees of *Juglans regia* near a hamlet, and a small unflowered *Impatiens* was abundant by a low brook.

The ridge was covered with shingle, frequently granitic, with occasional blocks of grit, showing evidence of contact with trap, and but rarely could a sight be got of the bluish schistose grits *in situ*, in strata dipping at a very high angle to the eastward. This was the nearest I got to the Peer Ghul mass, the strata of which—so far as could be made out from a distance—appeared to have a similar dip and direction.

On May 12th we marched about 8 miles to Ruzmuk, still in a northerly direction up the bed of the stream we had followed two days before. The more notable plants were the following:—*Cotoneaster*; *Berberis*; *Amygdalus persica*; a species of *Berchemia* (undescribed?) that I had previously found in Huzārā; an *Urtica* (*U. urens*? called by Affghans *sayankāi*, “the stinger”); *Blitum virgatum*; *Peganum* and *Verbascum Thapsus*. A creeping *convolvulus*, with very white silky leaves, abounded in fields latterly,

and a very pilose form of *Ceratocephalus falcatus* was profuse in one small patch.

Just before reaching our new camp we passed an extensive mass of the thin-bedded bluish calcareous shale, covered with vegetable impressions, which we had before seen above Bungī Wālā. Here it was overlying the strata of a ridge of grit, both being highly inclined to the west.

Our road lay up the ravine which the brook had cut through among sloping beds of shingle, which filled up the lower part of the space between the higher hills to the right and left, and there was a considerable ascent till we reached our camp, which was the highest (7000 feet above the sea) we had during the expedition.

On May 13th we halted, and I took a short stroll round by a hill to the east of camp, where was abundance of many of the common spring-plants of the frontier, besides a second *Delphinium* (*D. camptocarpum*?) and a fine red thistle (*Carduus nutans*), which was greedily eaten by the camels, who had hardly left me a single specimen worth taking. Here also I found *Diplopappus molliusculus*, *Thlaspi arvense*, and in one place a profusion of *Hyoscyamus niger*.

On May 14th our march was a short one of 5 miles to the north-east.

For the first mile and a half we continued to ascend the bed of the stream as before, but then crossing a minor watershed, we made a very rapid descent the rest of the way, in a rough precipitous gorge, among limestone and calcareous shale generally dipping to the eastward at a high angle, and occasionally much bent. Down this gorge ran a small brook, the commencement of the Khyssore, which debouches on the plain a few miles to the south of Bunnoo, and the easterly course of which we afterwards followed for five days till we issued from the hills.

Besides the shrubs of the preceding two days, *Viburnum cotinifolium*, *Cratægus*, and *Buddlæa* were common, and *Sageretia*, and *Reptonia*, which had not been seen for some time, again appeared, thus indicating a considerable descent.

The only novelty was an *Acanthophyllum*, of which a few prickly clumps were found near the level spot on which we encamped. To reach the latter, we ascended from the stream to the right (east) over the edges of strata of ferruginous grit, dipping at a very high angle to the north-east.

The district about Kānigoorum has long been noted for its iron, of which large quantities are in the cold season brought into Bunnoo at the weekly market, and for several days rude furnaces with large collections of clay-ironstone and slag-heaps had frequently been seen by our troops in the villages, but nowhere

previously had I remarked any place so likely to be near the ore *in situ* as this. My attempts to get a guide, &c., in order to visit the mines were unsuccessful; but the process of mining I understood (from Wuzeeree information) to consist of simply following the outcropping ferruginous strata, by scraping off the superincumbent non-metalliferous rock, in places where both have generally a steep slope.

On May 15th we marched 15 miles down the Khyssore, passing groves of fine olive-trees on our way from Razānī, where we had been encamped.

The strata shown in section in the ravine were mostly of calcareous schist, similar to those on the Zām above Bungī Wālā, generally dipping steeply towards the west, and often with thick horizontal beds of shingle overlying them.

The plants were as follows:—*Quercus ilex*, getting rare as we descended, *Rhamnus virgatus*, *Acacia modesta*, *Celastrus*, *Chamaerops*, *Periploca*, and *Ephedra*, all becoming common, and none of which had been found above this; also *Andrachne telephoides*, *Heliotropium ramosissimum*, *Boerhaavia procumbens*, and *Solanum Jacquini* reappeared during this march.

A foetid white tomentose Labiate (*Salvia lanata*?) was common most of the way, with *Vebascum*, *Peganum*, and the *Kāneegoorum Cousinia*.

Of grasses, the tall *Aristida* was abundant, with *A. setacea*, *Cymbopogon iwarancusa*, *Eragrostis cynosuroides*, and a tall *Saccharum*, and I found one or two tufts of an *Ægilops*.

*Linaria cabulica* was occasional on the cliffs (although *L. ramosissima* had been the common form in this district as along the frontier generally), and an unflowered species of *Statice*, with one or two plants of a *Dianthus*, occurred.

About midway there grew on the rocks abundance of a *Lycium* (?), but much too young for determination, and I found in fruit a few trees of a *Pistacia* (I think *P. terebinthus*), called in Pushtū *shnee*. Griffiths supposed a noted Affghan plant called by this name to have been a *Xanthoxylon*, but it is more likely to have been a *Pistacia*.

The *Acanthophyllum* of the 14th was common at our camp of Siroba, near which *Reptonia*, *Acacia modesta*, and *Olea* were the predominant shrubs.

On May 16th we marched 11 miles down the stream to Dawa Waka. *Morus*, *Populus*, and *Salix* were now common along the banks, although the preceding day neither of the two former were seen; small *Tamarix* occurred, and *Tecoma*, *Dodonæa*, *Punica granatum*, *Vitex*, and *Cocculus Leae* abounded. The following plants likewise reappeared or became common:—*Achyranthes*

*aspera*, *Aplotaxis candicans*, *Lactuca auriculata*, *Centaurea calcitrapa*, *Cirsium arvense*, *Calotropis procera*, *Lycopus europæus*, *Eremostachys*, *Salvia pumila*, *Plantago lanceolata*, *Verbena officinalis*, *Samolus Valerandi*, *Capparis spinosa*, *Eriophorum comosum*, and *Typha angustifolia*. Plants of a *Cucumis* also (*C. pseudocolocynthis*?), not uncommon along the frontier, and often met with in the lower part of the Zām, here reappeared, as did *Ærua javanica*.

The rocks seen *in situ* were mostly calcareous shale, and their dip was to the north-west, almost at right angles to that of the strata passed through on the previous day.

We halted a day at Dawa Warka, which is probably about 3000 feet above the sea.

On May 18th we marched 10 miles down the Khyssore to Speenwām, and on the way passed through a tract geologically similar to that about Palosin, with ridges of various limestones in highly inclined strata, heaps of decomposing parti-coloured shales, and blocks of the coralline and nummulitic limestone scattered about. We then entered upon the sandstone and conglomerate district, thus almost exactly taking in reverse the rocks we had met with in ascending the Zām. Both the sandstone and nummulitic districts, however, appeared here to be of much smaller extent from east to west than on the lower Zām.

We had now almost got into the plains; the crops were ripe, the *Vitex* in flower, and *Capparis aphylla*, *Zizyphus jujuba*, and the other ordinary frontier-plants, were abundant.

On May 19th the first mile and a half of the march carried us quite out from between the low sandstone hills among which we had been encamped, and into the plain of Bunnoo, which place we reached on the following day.

In reviewing shortly the vegetation of the country passed through, I find that it may be conveniently divided into two zones or regions. The outer (lower) of these would comprise the Zām from the plains up to Anāi, and the Khyssore up to above Dawa Warka, *i. e.*, from about 1000 to 3500 feet above the sea; and the upper one, nearer the centre of the mountain range, would include all the country visited by us above these two places, *i. e.*, from 3500 to 8300 feet above the sea, comprehending the upper Zām and some of its tributaries, the hills near Kāneegoorum, and northward to below the Ruymuk Pass.

I shall proceed as concisely as possible and at the risk of much repetition to enumerate, so far as they have been identified, the chief plants observed in each of these zones, beginning with the former.

Of trees there are none, if we except the four or five species



(*Salix*, *Populus*, *Morus*, *Dalbergia*, and *Ficus*) which, although common along the banks of streams, are, if not introduced, at least fostered and spread by the aid of man.

The principal indigenous shrubs and climbers are mostly the same as those ordinarily found on the lower dry hills of this frontier, and are as follows:—*Cocculus laëba*; *Capparis aphylla* and *C. spinosa*; *Abutilon indicum*, *Sida humilis*; *Melhania abutiloides*; *Grewia betulæfolia*; *Dodonæa Burmanniana*; *Celastrus*; *Zizyphus jujuba*, *Rhamnus virgatus*, *Sageretia* (n. sp.); *Rhus acuminata*; *Acacia modesta*, *A. farnesiana*, *Dalbergia sissoo*, *Edwardsia*, *Crotalaria*, *Taverniera*, and four spinous shrubby *Astragali*; *Tamarix dioica*; *Reptonia buxifolia*; *Olea europæa*; *Tecoma undulata*; a spinous half-shrubby *Convolvulus*; *Ehretia aspera*; *Adhatoda vasica*; *Vitex negundo*, *Lantana alba* (?); *Salvadora*; *Populus alba*, *P. euphratica*, *Salix babylonica*; *Celtis nepalensis*; *Ficus caricoides*; *Ephedra*; and *Chamærops Ritchiana*.

The herbaceous vegetation found in this region, like the ordinary spring-herbs of the Punjāb and North-West Provinces, shows a striking resemblance to that of Europe; indeed the genera and even the species are in many cases identical with those of Britain, as will at once be seen from the following list:—*Ranunculus arvensis*, *R. sceleratus*, *R. muricatus*, *R. aquatilis*, *Adonis æstivalis*, *Delphinium penicillatum*; *Papaver cornigerum*, *P. lævigatum*, *P. dubium*; *Fumaria parviflora*; *Goldbachia lævigata*, *Sisymbrium irio*, *Malcolmia africana*, *M. sp.*, *Notoceras sp.*, and three other *Cruciferae* (we were, however, too late for many of this family, the plants of which in this part of India generally precede those of most others in spring); *Oligomeris glaucescens*; *Cleome ruta*, *C. linearis*, *C. sp.*; *Viola*; *Polygala sp.*; *Silene leysseroides*, *Cerastium viscosum*; *Linum strictum*; *Euphorbia hypericifolia*, *E. thymifolia*, *Andrachne telephioides*, *Crozophora tinctoria*; *Malva parviflora*, *M. sylvestris*; *Corchorus trilocularis*; *Erodium sp.*; *Oxalis corniculata*; *Fagonia cretica*, *Peganum harmala*, *Tribulus terrestris*; *Trigonella incisa*, *Melilotus parviflora*, *Medicago maculata*, *M. denticulata*, *Lathyrus aphaca*, *Astragalus sp.*; and three other *Leguminosæ*; *Potentilla supina*; *Cucumis sp.*; *Portulaca quadrifida*; *Spergularia rubra*, *S. marina*, *Cometes sp.*; *Orygia trianthemoides*; *Psammogeton biternatum*, *Pimpinella sp.*; *Bunium sp.*; and four other *Umbelliferae*; *Galium aparine*; *Scabiosa Olivieri*; eighteen species of *Compositæ*, including *Artemisia elegans*, *Berthelotia lanceolata*, *Trichogyne cauliflora*, *Lactuca auriculata*, *Aplotaxis candicans*, *Cousinia calcitrapæformis*, *Centaurea calcitrapa*, *Microrhynchus nudicaulis*, *Sonchus arvensis*, *Eclipta erecta*, *Filago germanica*, *Scorzonera*, n. sp. (?), *Blumea sp.*, and *Echinops sp.*; *Samolus Valerandi*, *Anagallis arvensis*;

*Rhazya stricta*; *Periploca aphylla*, *Orthanthera viminea*, *Pentstemon microphylla*, *Boucerosia* sp., and two other *Asclepiadaceæ*; *Convolvulus pluricaulis*, *C. arvensis*; *Heliotropium europæum*, *H. brevifolium*, *H. ramosissimum*, *Arnebia echioides*, *Lycopsis arvensis*, *Cynoglossum* sp., and *Asperugo* (?); *Withania somnifera*, *W. coagulans*, *Solanum nigrum*, *S. Jacquini*, *S. gracilipes* (?), *Scopolia præalta* (?); *Linaria ramosissima*, *L. cabulica*, *L. sp.*; *Veronica agrestis*, *V. anagallis*, *Herpestis monniera*; *Dicliptera Roxburghiana* (?); *Verbena officinalis*, *Lippia nodiflora*; seven *Labiata*, including *Lycopus europæus*, *Lallemantia Royleana*, *Salvia pumila*, and *S. sp.*; *Plantago major*, *P. lanceolata*, *P. bauphula*, *P. eriantha* (?), and other two *Plantagos*; twelve species of *Salsolaceæ*, including *Panderia pilosa*, *Atriplex laciniata*, *Salsola kali*, *Anabasis multiflora*, *Caroxylon foetidum*, *G. Griffithii*, *Chenopodium album*, *C. hybridum*, and *Halocharis* sp.; *Pupalia lappacea*, *Achyranthes aspera*, *Ærua javanica*; *Boerhaavia procumbens*, *B. repanda* (?), and *B. sp.*; *Polygonum barbatum*, *Rume vesicaria*; *Thymelæa arvensis*; *Forskalea tenacissima*; *Allium leptophyllum*, *Asparagus* sp.; *Typha angustifolia*. Of grasses about 40 species, including the following: *Andropogon involutus*, *A. Bladhii*, *A. ischæmum*, *A. sp.*, *Panicum maximum*, and two other species, *Pennisetum cenchroides*, *P. araneosum*, *Aristida setacea*, and two others, *Eragrostis cynosuroides*, and two others, *Heteropogon contortus*, *Digitaria sanguinalis*, *Dactyloctenium ægyptiacum*, *Bromus mollis*, *Eleusine flagellifera*, *Cynodon dactylon*, *Kœhleria cristata*, *K. sp.*; *Imperata Kœnigii*, *Avena fatua*, *Cymbopogon iwarancusa*, *Agrostis alba* and two others, *Phalaris canariensis*, *Chloris* sp., *Lolium temulentum*, *Sporobolus* sp., *Saccharum* sp., *Arundo karka*, *Nardus stricta*, *Rottbollia hirsuta*, two species of *Stipa*, *Polypogon monspeliensis*, and one species each of *Pappophorum*, *Chrysopogon*, *Phleum*, and *Cenchrus*; *Eriophorum comosum*, *Scirpus maritimus*, *Cyperus niveus*, *C. exaltatus*, *C. rotundus*; *Adiantum capillus veneris*; and *Equisetum debile*.

In regard to the second (inner or upper) zone, it is worthy of remark that, although abundance of large forest-trees would have been found even in the most western Himalaya, at heights much under that which we have reached (8000 feet above the sea), yet the largest plants we met with in Wuzeeristān were species of *Quercus*, which in strictness could only be called *sub-arboreous*, being very seldom indeed "more than three times the height of a man." Doubtless numerous pines and other large trees were visible on Peer Ghul, but probably none lower than 9000 feet, and these we cannot take into our estimate, as we did not reach that mountain. This fact of the absence of large trees probably depends in part on the aridity of this tract of country, and in part on the great scarcity of soil over most of it.

The following is a list of the predominant arbusculi, shrubs, and climbers of this region :—

Four species of *Clematis*, including *C. grata* and *C. montana*; *Berberis* *Lycium*; *Buxus sempervirens*; *Berchemia*, n. sp.; *Sageretia* sp.; *Zizyphus vulgaris*; *Rhus cotinus*, *Pistacia terebinthus*; *Edwardsia mollis*, *Indigofera*, and two spinous *Astragali*; *Cotoneaster vulgaris*, *C. rotundifolia*, *C. sp.*; *Prunus armeniaca*, *Amygdalus persica*, *Spiræa Lindleyana*, *Rubus fruticosus*, *Cratægus*, sp.; *Rosa* sp.; *Punica granatum*; *Lonicera quinquelocularis*, *L. sp.*; *Viburnum cotinifolium*, *Abelia triflora*; *Gardenia tetrasperma*; *Olea europæa*, *Fraxinus xanthoxyloides*, *Syringa* sp.; *Jasminum revolutum*, *J. officinale*; *Buddæa crispa*; *Daphne oleoides*; *Quercus ilex*; *Q. laxiflora* (?), *Salix babylonica*; *Celtis nepalensis*, *C. caucasica*; *Ficus caricoides*; *Ephedra*. One parasite, *Viscum album*, was common on oak and olive at various places.

The more prominent herbs were as follows :—

*Ranunculus lætus*, *R. arvensis*, *Delphinium camptocarpum* (?), *Adonis æstivalis*, *Aquilegia vulgaris*, *Thalictrum* sp., *Ceratocephalus falcatus*; *Hypecoum procumbens*, *Fumaria parviflora*; nine species of *Cruciferae*, including *Barbarea vulgaris*, *Thlaspi arvense*, *Neslia paniculata*, *Lepidium draba*, *Arabis arenosa*, *Sisymbrium sophia*, and *Nasturtium* sp.; *Viola serpens*; *Polygala elegans* (?); *Silene conica*, *Stellaria media*, *Cerastium viscosum*, *Acanthophyllum* sp., *Dianthus* sp.; *Euphorbia helioscopia*, *E. sp.*; *Malva parviflora*; *Erodium cicutarium*, *Geranium nepalense*, *G. sp.*; *Impatiens* sp.; *Oxalis corniculata*; *Astragalus tribuloides*, and other four *Astragali*, *Trigonella incisa*, *T. Emodi*, *Vicia sativa*, *V. sp.*; *Medicago lupulina*, *Lotus angustissimus*, *Trifolium repens*, and other five *Leguminosæ*; *Fragaria indica*, *F. vesca*, *Potentilla supina*, and other two species, *Sanguisorba* sp.; *Sedum adenotrichum*; *Saxifraga ligulata*; *Bupleurum marginatum*, *Prangos* sp. (?), and other three *Umbelliferae*; *Rubia cordifolia*, *Galium tricornu* (?), and *G. aparine*; *Scabiosa succisa*; *Morina Wallichiana*, *Valeriana* sp., *Valerianella* sp.; twenty-six species of *Compositæ*, including the following—*Guaphalium multiceps*, *G. sp.*; *Cousinia* sp.; *Phagnalon denticulatum*, *Serratula pallida*, *Diplopappus molliusculus*, *Carduus nutans*, *Cirsium arvense*, *Franseria crispa*, *Filago germanica*, *Aplotaxis candicans*, *Taraxacum officinale*, *Cichorium intybus*, *Othonna* sp., *Xanthium strumarium*, *Bidens pinnata*, *Blumea* sp., *Senecio* sp., *Saussurea* sp., and *Artemisia laciniata* (?); two species of *Campanula*; *Androsace incisa*, *Samolus valerandi*; *Vincetoxicum* sp.; *Convolvulus arvensis*, *C. sp.*; *Lithospermum arvense*, *Rochelia stellulata*, *Nonnea Edgeworthii*, *Onosma* sp.; *Hyoscyamus niger*, *Datura stramonium*, *Solanum nigrum*; *Veronica biloba*, *V. agrestis*, *V. anagallis*, *Scrophularia cabulica*, *S. decomposita*,

*Verbascum thapsus*, *Linaria cabulica*, *Leptorhabdos parviflora*; *Verbena officinalis*; twenty-one species of *Labiatae*, including two of *Mentha*, *Scutellaria linearis*, *S. sp.*, *Ajuga parviflora*, *Thymus sp. (?)*, *Lycopus europæus*, *Lallemantia Royleana*, *Plectranthus rugosus*, *Eremostachys laciniata*, *Marrubium vulgare*, *Phlomis sp.*, *Nepeta raphanorrhiza*, *Salvia glutinosa*, *S. lanata*, and three other *Salviae*; *Statice sp.*; *Plantago major*, *P. lanceolata*; *Chenopodium botrys*, *Blitum virgatum*; *Polygonum aviculare*, *P. flaccidum*; *Cannabis sativa*, *Urtica sp.*; *Alisma plantago*; three species of *Liliaceae*; *Juncus glaucus*, *J. articulatus*; *Cephalanthera ensifolia*; sixteen species of grasses, including *Ægilops sp.*, *Andropogon involutus*, *A. sp.*, *Bromus mollis*, *Dactylis glomerata*, *Chloris sp.*, *Digitaria sanguinalis*, *Sporobolus sp.*, *Hordeum sp.*, *Koehleria sp.*, two species of *Melica*, *Apluda geniculata*, *Anthistiria sp.*, *Agrostis alba*, and a *Saccharum*; *Cyperus niveus*, *Malacochæte pectinata*, *Fimbristylis sp.*, *Scirpus maritimus*, and three *Carices*; *Adiantum capillus veneris*, *Pteris longifolia*, and *Equisetum debile*.

In reviewing the vegetation of this upper district, it is remarkable that most of the shrubs are identical with Himalayan plants, the number of northern and western forms (including *Ephedra* and some of the species of *Quercus*, *Celtis*, and *Rhus*) being very small; whereas of the herbaceous plants, as in the lower zone, a large proportion are western and European species.

In all rather more than 400 species of plants were collected between Tāk and Bunnoo, about 70 of these being wood-climbers, shrubs, or sub-arboreous, the rest herbaceous; but as many of the species have yet to be identified, I can give no more minute analysis than the above.

The proportion of grasses, in all 50 species, is large, being about one-eighth of the plants collected; but if we exclude them, the number of endogens, including the single orchid, is strikingly small, and depends in part, like the absence of forest-trees and the scarcity of ferns, on the deficiency of moisture.

For the manifold imperfections of these notes on Wuzeeristān, apology as regards the botanical part will be hardly necessary to those who have botanised in unexplored districts, beyond the possibility of reference to libraries and herbaria; and I have thought it better to insert even my few notes on the geology of the country than to leave the subject quite untouched.

As regards identifications of plants, I have in general only trusted myself where my data were pretty sure; and I venture to think that my errors in this respect will be found to be more of omission than of commission.

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